DISTRIBUTED FLOATING SERIES ACTIVE IMPEDANCES FOR POWER TRANSMISSION SYSTEMS

ABSTRACT

Floating electrically isolated active impedance modules are formed to attach to power transmission lines without breaking the lines such that the power line forms a secondary of the main transformer of the module. Each module includes an electrical energy storage device and a switching circuit, such as a single phase inverter, connected to the storage device and to the main transformer primary winding. The inverter can be controlled to couple a selected voltage to the transmission line through the main transformer primary winding which can provide effective positive impedance, negative impedance, or a voltage at or near phase quadrature with the line current. Many active impedance modules may be distributed over a power system grid to allow control of the impedance of the power lines in the grid and to steer power through the grid, with each module electrically isolated from ground and from other phase lines of the transmission system.